EXECUTIVE SUMMARY

The Busseron Creek watershed drains approximately 235 square miles of primarily agricultural and forested land in southwestern Indiana. Several waterbodies in the watershed do not meet water quality standards and appear on Indiana's Clean Water Act Section 303(d) list of impaired waters. Federal law and U.S. Environmental Protection Agency (EPA) regulations require that states develop Total Maximum Daily Loads (TMDLs) for such impaired waters. A TMDL is defined as "the sum of the individual wasteload allocations for point sources and load allocations for nonpoint sources and natural background" such that the capacity of the waterbody to assimilate pollutant loadings is not exceeded. This report presents the TMDLs for the Busseron Creek watershed and provides recommendations for activities that are necessary to restore water quality in the watershed.

One of the first tasks of this project was to re-assess the causes of impairment appearing on the 2006 Section 303(d) list for the Busseron Creek watershed. Such re-assessments are frequently made at the beginning of TMDL projects to utilize any new information that might be available since the original listing decisions were made. As a result of the re-assessment, the pollutants for which TMDLs were developed differ from the pollutants appearing on the 2006 Section 303(d) list for the following reasons:

- Sampling performed by the Indiana Department of Environmental Management (IDEM) in 2006 generated new water quality data that were not available at the time the 2006 Section 303(d) list was developed.
- Indiana is in the process of modifying its criteria for sulfates. Although many of the waterbodies in the watershed did not meet the old criteria, they all meet the proposed criteria.
- Indiana's revised water quality standards no longer contain a numeric criterion for total dissolved solids. No TMDLs were therefore developed for the waterbodies previously listed for total dissolved solids.
- Sampling performed by the U.S. Geological Survey in September 2007 documented more widespread biological impairments in the Busseron Creek watershed than were previously known to exist. A weight of evidence analysis suggests the most likely cause of the widespread biological impairments is concentrations of metals (primarily iron and aluminum) that do not meet IDEM's numeric criteria.

Once the TMDL pollutants had been identified, the various potential sources were evaluated. The primary source of the metals is believed to be runoff from historic (abandoned) and therefore unregulated mining activities. Sources of other pollutants, such as phosphorus and total suspended solids, include runoff from row crops, livestock operations, and failing septic systems.

Load duration curves were used to calculate observed and allowable pollutant loads for each of the impaired waterbodies and the allowable loads were allocated to regulated and unregulated sources, as required by the Clean Water Act. Relatively large reductions in observed loads are needed to meet water quality standards for most pollutants for most waterbodies in the watershed. Because the majority of loading is originating from unregulated sources, the voluntary adoption of various best management practices will be needed to achieve the recommended reductions. Such practices should include filter strips, nutrient management plans, conservation tillage, and septic system maintenance programs. Current efforts by the Indiana Department of Natural Resources to address runoff from historic mining areas are also critical and should receive a high priority for continued funding. Periodic monitoring of the watershed should be conducted to track

progress toward meeting water quality standards, and to adjust implementation strategies to prioritize those activities found to be most cost effective.